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**(54) Improvements in toothbrushes for personal hygiene purposes**

Zahnbürsten für die persönliche Hygiene

Brosses dentaires pour l'hygiène personnelle

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(73) Proprietor:  
**McDougall, Gregory John**  
**Kowloon Bay, Kowloon (HK)**

(72) Inventor:  
**McDougall, Gregory John**  
**Kowloon Bay, Kowloon (HK)**

(74) Representative:  
**Findlay, Alice Rosemary**  
**Lloyd Wise, Tregear & Co.,**  
**Commonwealth House,**  
**1-19 New Oxford Street**  
**London WC1A 1LW (GB)**

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## Description

[0001] This invention relates to a brush for personal hygiene purposes more particularly, but not exclusively, to a toothbrush.

[0002] Power driven toothbrushes, for example, electric toothbrushes, have been proposed in which either a toothbrush head or the bristles protruding therefrom are driven to move in a reciprocally rotational manner.

[0003] It is a disadvantage of the such proposed toothbrushes that the transmission from a power means to the toothbrush head to drive this in reciprocal motion is generally complicated and thus expensive to manufacture.

[0004] US 2598275 discloses the features of the preamble of claim 1. In this power driven toothbrush a linearly reciprocable shaft is driven by a motor, the shaft being connected off centre to a rotatable brush head. A biasing spring is used to prevent the shaft lying in a dead centre position.

[0005] It is the object of the invention to provide an improved powerable brush for personal hygiene purposes.

[0006] According to the invention there is provided a brush for personal hygiene purposes comprising a rotatably mounted brush head, a connection member for connection to a linear reciprocal drive means and a member disposed between the connection member and the brush head and for converting linear reciprocal motion of the connection member to rotational motion of the head, characterized in that said member disposed between the connection member and the brush head is a flexible member which is biased in a direction laterally away from the direction of linear reciprocal motion of the connection member.

[0007] With an arrangement of this type, complicated gearing arrangements for converting the reciprocal motion of the connection member to rotational movement of the brush head are not needed, thus simplifying the construction of the brush.

[0008] Preferably the flexible member is formed from metal wire.

[0009] In a further preferred form, the flexible member is provided with a loop which is arranged to move in reciprocation with the connection member in a channel, the edges of the loop contacting the sides of the channel to support that portion of the flexible member.

[0010] In a preferred embodiment the brush comprises: a main body; a detachable head part having the rotatably mounted brush head thereon; a driven member connected to the linear reciprocal drive means in said main body; and coupling means provided on said driven member and on said connection member to provide a releasable coupling therebetween, said coupling means being adapted to provide coupling between said members, when the head part is in a first orientation relative to the main body part, and to allow said members to be detached when in a second orientation in which

said head part is rotated relative to the main body.

[0011] By this means a simple rotation of the head part is sufficient to couple or uncouple the driven and connection member.

[0012] Preferably, the main body and head part are provided with engagement means to allow these to be push-fitted together or pulled apart when the head part is in the first orientation, and when fitted, rotated to the second orientation in which the head part is prevented from release. This construction means that the coupling between driven and connection members is effected as the head part is fitted onto the main body.

[0013] In a preferred embodiment, the coupling means comprise a pair of opposed legs extending from an end of the connection member having inwardly directed fingers, and a pair of grooves formed in opposite sides of the driven member within which the fingers are engagable when the head part is in the second orientation. The engagement means comprise an axial plug formed on the main body, for receipt in a socket-like end of the head part, the plug being formed with at least one outwardly directed locking lug, and the head part being formed with a lug-receiving groove having an axial portion to allow a push-fit of the head part onto the housing, and a circumferential portion defining internally a shoulder behind which the lug engages on rotation of the head part to the second orientation. One of the driven member and connecting member is formed at its coupling end with a locating pin, the other having a locating socket. The locating pin is at the end of the driven member, which narrows towards the pin, whereby the opposed legs are pushed apart as the driven member and connecting member are coupled together.

[0014] Means may be provided for moving the connection member reciprocally comprising drive means for driving a cam, the cam comprising a circular member offset relative to a driving axis, the circular member being held for rotation relative to a follower connectable to the connection member via a linear guide.

[0015] Rotation of the offset circular member causes a combined pivotal and linear reciprocal movement of the follower, with only the linear reciprocal component being transferred to the guide.

[0016] Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings in which;

Figure 1 is a sectioned plan view of the transmission elements of a first embodiment of the invention;

Figure 2 is a sectional side view across 2'-2' of Figure 1 showing, in addition, a brush head of the embodiment of the invention;

Figure 3 is a view in the direction of arrow 3' of Figure 2 of the brush head;

Figure 4 is a sectional side view of a reciprocating drive mechanism of the embodiment of the inven-

tion with

Figure 5 being a view in the plane 5-5, of Figure 4; Figure 6 is a view similar to Figure 1 illustrating a second embodiment of the invention;

Figure 7 is a view in the direction 7'-7' of Figure 6;

Figure 8 is a sectional view showing the brush head in accordance with a second embodiment of the invention;

Figure 9(a) is an exterior view of a toothbrush;

Figure 9(b) is a part-sectional view to show the coupling between a driven member and connection member; and

Figure 10 is a detailed view showing the coupling between driven member and connection member, and between housing parts.

[0017] With reference to the Figures 1-3, an embodiment of a brush, in this case a toothbrush, is shown. The toothbrush is arranged to be power driven in a rotationally reciprocal manner and comprises a head, 100, having a rotatable base member, 102, from which an array of bristles, 104, project as shown more clearly in Figures 2 and 3. The member, 102, is provided with an axially disposed bore, 106, through which a mounting pin, 108, projects.

[0018] The pin, 108, is connected at one end to a support member, 110, and the head, 100, is held in place for free rotation on the pin by means of a cap, 111.

[0019] The support member, 110, defines a channel in which a connection member, 150, for connection to a reciprocal driving means (shown in Figures 4 and 5) is provided. The connection member 150 is connected to member 102 of head 100 by means of a flexible member, 160, formed preferably from spring steel wire or ribbon. The flexible member, 160, is attached to the connection member, 150, by means of adhesive or a mechanical fitting and includes an upstanding free end, 162, which engages a corresponding bore, 114, which is disposed in member 102 radially outwardly of the centre.

[0020] By moving the member 150 between the positions shown by full lines (112) and by phantom lines, (113) in Figure 1, the flexible member will place a torque on head, 100, thus causing this to rotate. If the member, 150, is moved reciprocally, the head will rotate backwards and forwards through an angle  $\alpha$ , (in this case,  $120^\circ$ ) between positions defined by the different relative positions of the end 162, that is between positions 112 and 113. The member, 160, is flexible but sufficiently rigid to rotate the head, 100, in response to force supplied from member 150, and at the same time, conform to the rotated position of opening 112.

[0021] The member, 160, does not have a linear neutral position but is biased in the direction of arrow A, ie it is bent so as to exert a force in the direction of the arrow A in a direction generally perpendicular to the direction of movement. Such an arrangement acts to prevent the member, 160, when in position 112 accidentally going

"over-centre" and continuing a clockwise stroke in the direction of arrow C, rather than reciprocating in an anti-clockwise direction back to position 113.

[0022] The member, 110, provides a base and upstanding sides to form a channel in which member 150 reciprocates, and a cover, 170, is affixed to the sides of member 110 to encase the member, 150.

[0023] The free end of member 150 is provided with means for connection to a driving member, 222, when the brush is attached to a driving means (illustrated in Figures 4 and 5). Such a driving means is preferably contained within a hand-held casing in a manner of a conventional electric toothbrush, and which will be described further below. Member 110 is connected by known means to the casing so that member 110 provides a support integral with the toothbrush casing while allowing member 150 to be driven reciprocally by the driving means.

[0024] With reference to Figures 4 and 5, a driving means for the toothbrush, shown in Figures 1-3, is shown which comprises a motor, 200, to which two supporting members, 202, 204 are connected. Motor, 200, includes a shaft, 206, connected to a pinion gear, 208. A support shaft, 210, is connected between supporting members, 202, 204 and rotatably supports a driven member, 212, which includes, at one end, an annular rack, 214, for engagement with pinion, 208, and at the other, a circular member, 216, connected to the rack, 214, by a cylindrical portion, 215. The circular member, 216, is offset relative to shaft, 210, as shown more clearly in Figure 5, and is held in a corresponding opening, 218, in a follower, 220, the member 216 and follower 220 being relatively rotatable. Follower 220 is connected to a drive member, 222, by means of a pivot joint, 224.

[0025] In use, rotation of motor, 200, will drive pinion gear, 208, which will in turn cause rack, 214, to rotate correspondingly, thus rotating member 212. As circular member, 216, is offset, this will follow an eccentric motion which will cause follower 220 to follow the same path of motion, thus moving pivotally about bearing 224, but also moving reciprocally in the direction of arrows B-B of Figure 5, and causing drive member 222 to follow such motion.

[0026] Drive member 222 further includes first and second legs, 230, which mate against the side of the central cylindrical portion, 215, of driven member, 212, which acts to guide the member 222 on a linear path.

[0027] A further embodiment of the invention is illustrated in Figures 6 and 7. Figure 6 is similar to Figure 1 with the main difference being that the flexible member (here given reference 360), includes a loop, 362, disposed between the connections to member 150 and head, 100 and resting on a shelf, 363, of member, 150. The loop, 362 has two functions. The first is that the edges of the loop are arranged to touch the sides 132, 134, of support member 110, thus steadying the flexible member as a whole.

[0028] Secondly, the loop adds rigidity to the connection to the member 150, with the flexible function being provided by the portion of the member, 364, between the loop and the head, 100, which is biased in the direction of arrow A. With such an arrangement, the angle of rotation of the head can be increased to angle  $\beta$  (120°), to just before the path of reciprocation of the member 150.

[0029] A stop, 366, is also provided which limits the movement of the connection member, 150. This allows easy engagement of the connection member with the drive member, 222, when the two are pressed together without damage to the flexible member and head.

[0030] In an alternative arrangement of the head illustrated in Figure 8, a central portion of the base is provided with an upstanding disc-like portion 402 with a central pin 404. This central pin 404 is covered by a cap 406 formed of a soft resilient plastics or rubber-like material. The cap is arranged to lie a distance below the level of the bristles. This structure serves to limit the pressure with which the head is pressed against the teeth; if the user presses the head too hard against the teeth, he will feel the cap 406. This has the advantage that it reduces the chances of damage to the user's teeth and gums from the bristles, and also reduced damage and wear of the bristles, extending brush head life.

[0031] Figure 9(a) shows the exterior of the entire toothbrush which has a main body 502, including a lower casing part 504 which houses a recharging unit, and fixed thereto a motor casing part 506 which houses the driving means and motor 200 described above. Detachably connected to the body 502 is the head part 508 which has the rotatable brush head 100 at its end. The head part 508 includes the member 110 and connection member 150 described above.

[0032] As can be seen in Figure 10, means are provided on the main body 502 to allow releasable attachment of the brush part 508. These comprise a plug part 509 formed on the end of the casing part 506 which push-fit within a lower opening of the head part 508. The plug part 509 is formed with a pair of lugs 513 which fit in grooves 515 in the brush part. The lugs 513 and grooves 515 are relatively disposed so that after the head part 508 has been push-fitted onto the casing part 506, it must then be rotated through a quarter turn to bring these into appropriate alignment. During this rotation, the logs 513 move in internal grooves 517, engaging behind shoulder 519 so that the head part 508 cannot be pulled off the casing part 506. It is preferably arranged that the logs 513 are of different width to each other, so that the brush part can only be fitted in a single orientation.

[0033] As can be seen in Figures 9(b) and 10, means are provided to allow the connection member 150 to be coupled to the driving member 222 as the head part 508 is fitted on the main body 502, and to be uncoupled on detachment of the brush part. In particular, the driving

member 222 is formed with a pair of cut-outs or grooves 510, on opposite sides thereof, which define shoulders 511 at a forward end thereof. The forward or insertion end of the driving member 222 is formed with a conical portion 512 and a locating pin 514.

[0034] The coupling end of the connection member 150 is formed with a pair of opposed legs 516 formed of a resilient material such as springy plastics or metal which have inwardly directed fingers 518. Formed centrally on the connection member 150 is a locating socket 520.

[0035] On attachment of the head part 508, as this is pushed onto the end of the body 502, the legs 516 will become splayed apart as they move over the portion 512 and onto the regions of the driving member 222 between the grooves 510. Then, as the head part 508 is rotated, to lock this onto the body 502, the fingers 518 will engage in the grooves 510 so that the members 222 and 150 are coupled for linear reciprocal motion. The locating pin and socket assist in accurate coupling.

[0036] On detachment, as the head part 508 is rotated, the fingers will move apart as they move from the grooves 510 to the adjacent portion on the connection member. The head part 508 can then simply be pulled from the casing 506.

[0037] It will be appreciated that because the driving member 222 is reciprocally driven, it may stop at a range of positions relative to the casing part 506 and plug 509. The position of Figure 10 corresponds to a position in which the driving member 222 is close to its forward-most position. Similarly, the connection member 150 may be at a variety of positions relative to its housing. If the driving member 222 is in an extended position, and the connection member 150 also in an extended position (away from the head), then on attachment the connection member 150 will be pushed towards the head by the member 222 (which will not move) and the head will rotate very slightly. If the driving member 222 is in a retracted position, then as the head part 508 is push-fitted on the casing part 506, the fingers 518 will not reach the region of the driving member 222 between the grooves 510. However, when the motor is activated, the fingers will then snap-fit into the grooves 510 on the first forward stroke of the driving member 222.

[0038] This arrangement can thereby provide reliable coupling of the drive, irrespective of the positions of the driving member 222 and connection member 150.

[0039] It will be appreciated that the locations of the coupling means could be reversed between the driven member 222 and connection member 150. Similarly, the positions of locating pin 514 and socket 520 could be reversed.

## Claims

1. A brush for personal hygiene purposes comprising a main body and a head having a rotatably

mounted brush head (100), a connection member (150) for connection to a linear reciprocal drive means, and a member (160, 360) disposed between the connection member (150) and the brush head (100) for converting linear reciprocal motion of the connection member to rotational motion of the brush head, characterized in that said member (160, 360) disposed between the connection member and the brush head is a flexible member (160, 360) which is biased in a direction laterally away from the direction of linear reciprocal motion of the connection member (150).

2. A brush as claimed in claim 1 where in the flexible member (160, 360) is formed from metal wire.
3. A brush as claimed in claim 1 or 2 wherein the flexible member (160, 360) is in the form of wire or ribbon.
4. A brush as claimed in any one of claims 1 to 3 wherein the connection member reciprocates in a channel formed in a support (110).
5. A brush as claimed in claim 4 wherein the flexible member (360) is bent to have a loop (362) therein.
6. A brush as claimed in claim 5 wherein the loop (362) contacts sides of the channel in the support (110).
7. A brush as claimed in any one of the preceding claims further comprising a stop (366) for limiting movement of the connection member.
8. A brush as claimed in any one of the preceding claims wherein the brush head comprises a circular base (102) from which a plurality of bristles (104) project, the base having first means (106) for receiving a pivot and second radially offset means (112) for receiving an end of the flexible member (160, 360).
9. A brush as claimed in any one of the preceding claims further comprising means for moving the connection member reciprocally, including drive means (200) for driving a cam, the cam comprising a circular member (216) offset relative to a driving axis, the circular member being held for rotation in a follower (220) connectable to the connection member (150).
10. A brush as claimed in claim 9 wherein the circular member (216) is connected to an annular rack (214) engagable by a gear connected to the drive means (200).
11. A brush as claimed in claim 9 or 10 wherein the fol-

lower (220) is connected to a linearly guided member (222) via a pivot, the linearly guided member (222) being connectable to the connection member (150).

12. A brush as claimed in any one of the preceding claims, being a powered toothbrush.
13. A brush as claimed in claim 8 wherein the base (102) is provided with a central upstanding protrusion (404, 406) having a free end which lies below ends of the bristles.
14. A brush as claimed in claim 13 wherein the central upstanding protrusion is at least partly formed of a soft resilient material (406).
15. A brush as claimed in any preceding claim comprising:
  - a main body (502);
  - a detachable head part (508) with the rotatably mounted brush head (100) thereon;
  - a driven member (222) connected to the linear reciprocal drive means in said main body; and
  - coupling means provided on said driven member (222) and on said connection member (150) to provide a releasable coupling therebetween, said coupling means being adapted to provide coupling between said members when the head part (508) is in a first orientation relative to the main body part (502), and to allow said members to be detached when in a second orientation in which said head part (508) is rotated relative to the main body (502).
16. A brush as claimed in claim 15 wherein the main body (502) and head part (508) are provided with engagement means (509, 513, 515) to allow these to be push-fitted together or pulled apart when the head part is in the first orientation, and when fitted, rotated to the second orientation in which the head part is prevented from release.
17. A brush as claimed in claim 15 or 16 wherein the coupling means comprises a pair of opposed legs (516) extending from an end of the connection member having inwardly directed fingers (518), and a pair of grooves (510) formed in opposite sides of the driven member (222) within which the fingers (518) are engagable when the head part is in the second orientation.
18. A brush as claimed in claim 16 or 17 wherein the engagement means comprise an axial plug (509) formed on the main body, for receipt in a socket-like end of the head part (508), the plug being formed with at least one outwardly directed locking lug

(513), and the head part being formed with a lug-receiving groove (515) having an axial portion to allow a push-fit of the head part onto the housing, and a circumferential portion (517) defining internally a shoulder behind which the lug (513) engages on rotation of the head part to the second orientation.

19. A brush as claimed in any one of claims 15 to 18 wherein one of the driven member (222) and connection member (150) is formed at its coupling end with a locating pin (514), the other having a locating socket (520).

20. A brush as claimed in claim 19 wherein the locating pin (514) is at the end of the driven member (222), which narrows towards the pin, whereby the opposed legs (516) are pushed apart as the driven member (222) and connection member (150) are coupled together.

#### Patentansprüche

1. Bürste für die Körperhygiene, enthaltend einen Hauptkörper und einen Kopf mit einem drehbar angebrachten Bürstenkopf (100), ein Verbindungselement (150) zum Verbinden mit einem Antriebsmittel für eine hin- und hergehende Linearbewegung und ein Element (160, 360), das zum Umwandeln der hin- und hergehenden Linearbewegung des Verbindungselements in eine Drehbewegung des Bürstenkopfes zwischen dem Verbindungselement (150) und dem Bürstenkopf (100) angeordnet ist, dadurch gekennzeichnet, daß das Element (160, 360), das zwischen dem Verbindungselement und dem Bürstenkopf angeordnet ist, ein flexibles Element (160, 360) ist, welches in eine Richtung seitlich weg von der Richtung der hin- und hergehenden Linearbewegung des Verbindungselements (150) vorgespannt ist.
2. Bürste nach Anspruch 1, bei der das flexible Element (160, 360) aus einem Metalldraht gebildet ist.
3. Bürste nach Anspruch 1 oder 2, bei der das flexible Element (160, 360) in der Form eines Drahtes oder eines Bandes ausgebildet ist.
4. Bürste nach einem der Ansprüche 1 bis 3, bei der sich das Verbindungselement in einem Kanal hin- und herbewegt, der in einer Halterungseinrichtung (110) ausgebildet ist.
5. Bürste nach Anspruch 4, bei der das flexible Element (360) so gebogen ist, daß es eine Schlaufe (362) aufweist.
6. Bürste nach Anspruch 5, bei der die Schlaufe (362) mit den Kanalseiten in der Halterungseinrichtung (110) in Kontakt steht.
7. Bürste nach einem der vorstehenden Ansprüche, weiterhin enthaltend einen Anschlag (366) zum Begrenzen der Bewegung des Verbindungselements.
8. Bürste nach einem der vorstehenden Ansprüche, bei der der Bürstenkopf eine kreisförmige Basis (102) aufweist, von der mehrere Borsten (104) abstehen und die erste Mittel (106) zum Aufnehmen eines Zapfens sowie zweite, radial versetzte Mittel (112) zum Aufnehmen eines Endes des flexiblen Elements (160, 360) besitzt.
9. Bürste nach einem der vorstehenden Ansprüche, weiterhin enthaltend Mittel zum hin- und hergehenden Bewegen des Verbindungselements, welche Antriebsmittel (200) für den Antrieb eines Nockens aufweisen, der ein kreisförmiges Element (216) besitzt, das gegenüber einer Antriebsachse versetzt ist, wobei das kreisförmige Element zum Drehen in einem Folgeelement (220) gehalten ist, welches mit dem Verbindungselement (150) verbindbar ist.
10. Bürste nach Anspruch 9, bei der das kreisförmige Element (216) mit einem Zahnring (214) verbunden ist, der in Eingriff mit einem Zahnrad bringbar ist, welches mit dem Antriebsmittel (200) verbunden ist.
11. Bürste nach Anspruch 9 oder 10, bei der das Folgeelement (220) über einen Zapfen mit einem Linearführungselement (222) verbunden ist, das mit dem Verbindungselement (150) verbindbar ist.
12. Bürste nach einem der vorstehenden Ansprüche, die eine angetriebene Zahnbürste ist.
13. Bürste nach Anspruch 8, bei der die Basis (102) mit einem mittigen, aufrechtstehenden Vorsprung (404, 406) versehen ist, der ein freies Ende besitzt, welches unterhalb der Enden der Borsten liegt.
14. Bürste nach Anspruch 13, bei der der mittige, aufrechtstehende Vorsprung zumindest teilweise aus einem weichen, nachgiebigen Material (406) gebildet ist.
15. Bürste nach einem der vorstehenden Ansprüche, enthaltend:  
einen Hauptkörper (502),

ein lösbares Kopfteil (508) mit dem darauf drehbar montierten Bürstenkopf (100), ein angetriebenes Element (222), das mit dem Antriebsmittel für eine hin- und hergehende Linearbewegung in dem Hauptkörper verbunden ist, und

Kupplungsmittel, die an dem angetriebenen Element (222) und an dem Verbindungselement (150) vorgesehen sind, um zwischen diesen Elementen eine lösbare Kupplung zu bilden, wobei die Kupplungsmittel so ausgestaltet sind, daß sie eine Verbindung zwischen den Elementen bilden, wenn sich das Kopfteil (508) in einer ersten Orientierung, bezogen auf das Hauptkörperteil (502), befindet, und daß sie den Elementen ermöglichen, voneinander gelöst zu werden, wenn sie sich in einer zweiten Orientierung befinden, in der das Kopfteil (508) relativ zum Hauptkörper (502) gedreht ist.

16. Bürste nach Anspruch 15, bei der der Hauptkörper (502) und das Kopfteil (508) mit Eingriffsmitteln (509, 513, 515) versehen sind, um den Hauptkörper und das Kopfteil aufeinander zu schieben oder voneinander abziehen, wenn sich das Kopfteil in der ersten Orientierung befindet, und um, wenn sie aufeinander geschoben sind, in die zweite Orientierung gedreht zu werden, in der das Kopfteil an einem Abnehmen gehindert ist.

17. Bürste nach Anspruch 15 oder 16, bei der die Kupplungsmittel ein Paar einander gegenüberliegender Beine (516), die sich von einem Ende des Verbindungselements aus erstrecken, und die einwärts gerichtete Finger (518) besitzen, und ein Paar Nuten (510) enthalten, die an gegenüberliegenden Seiten des angetriebenen Elementes (222) gebildet sind, mit denen die Finger (518) in Eingriff bringbar sind, wenn sich das Kopfteil in der zweiten Orientierung befindet.

18. Bürste nach Anspruch 16 oder 17, bei der die Eingriffsmittel einen axialen, an dem Hauptkörper ausgebildeten Zapfen (509) zur Aufnahme in ein buchsenartiges Ende des Kopfteil (508), der mit zumindest einem nach außen gerichteten Verriegelungsvorsprung (513) versehen ist, wobei das Kopfteil mit einer einen Vorsprung aufnehmenden Nut (515) ausgebildet ist, die einen axialen Abschnitt aufweist, um ein Aufschieben des Kopfteil auf das Gehäuse zu ermöglichen, und einen Umfangsabschnitt (517) aufweisen, der innenliegend eine Schulter definiert, hinter der der Vorsprung (513) bei der Drehung des Kopfteil in die zweite Orientierung in Eingriff gelangt.

19. Bürste nach einem der Ansprüche 15 bis 18, bei der das angetriebene Element (222) oder das Verbindungselement (150) an seinem Kupplungsende mit einem Positionsstift (514) und das andere Element mit einer Positionsbüchse (520) versehen ist.

20. Bürste nach Anspruch 19, bei der der Positionsstift (514) sich an dem Ende des angetriebenen Elements (222) befindet, welches sich zum Stift hin verjüngt, wodurch die gegenüberliegenden Beine (516) auseinandergedrückt werden, wenn das angetriebene Element (222) und das Verbindungselement (150) miteinander gekuppelt werden.

#### Revendications

1. Brosse utilisée à des fins d'hygiène personnelle comprenant un corps principal et une tête présentant une tête de brosse (100) montée de manière rotative, un élément de raccordement (150) pour établir le raccordement avec des moyens d'entraînement effectuant un mouvement de va-et-vient linéaire, et un élément (160, 360) disposé entre l'élément de raccordement (150) et la tête de brosse (100) pour convertir le mouvement de va-et-vient linéaire de l'élément de raccordement en un mouvement rotatif de la tête de brosse, caractérisée en ce que ledit élément (160, 360) disposé entre l'élément de raccordement et la tête de brosse est un élément souple (160, 360) qui est incliné dans une direction latérale par rapport à la direction de mouvement de va-et-vient linéaire de l'élément de raccordement (150).

2. Brosse selon la revendication 1, dans laquelle l'élément souple (160, 360) est formé à partir d'un fil métallique.

3. Brosse selon la revendication 1 ou 2, dans laquelle l'élément souple (160, 360) se présente sous la forme d'un fil ou d'un ruban.

4. Brosse selon l'une quelconque des revendications 1 à 3, dans laquelle l'élément de raccordement effectue un mouvement de va-et-vient dans un canal formé dans un support (110).

5. Brosse selon la revendication 4, dans laquelle l'élément souple (360) est courbé pour recevoir une boucle (362) à l'intérieur.

6. Brosse selon la revendication 5, dans laquelle la boucle (362) entre en contact avec des côtés du canal dans le support (110).

7. Brosse selon l'une quelconque des revendications

précédentes, comprenant en outre une butée (366) pour limiter le mouvement de l'élément de raccordement.

8. Brosse selon l'une quelconque des revendications précédentes, dans laquelle la tête de brosse comprend une base circulaire (102) à partir de laquelle une pluralité de poils (104) fait saillie, la base ayant des premiers moyens (106) pour recevoir un pivot et des seconds moyens décalés radialement (112) pour recevoir une extrémité de l'élément souple (160, 360). 5
9. Brosse selon l'une quelconque des revendications précédentes, comprenant en outre des moyens pour déplacer l'élément de raccordement selon un mouvement de va-et-vient, comprenant des moyens d'entraînement (200) pour entraîner une came, la came comprenant un élément circulaire (216) décalé par rapport à un axe d'entraînement, l'élément circulaire étant maintenu pour tourner dans un galet (220) pouvant être raccordé à l'élément de raccordement (150). 10
10. Brosse selon la revendication 9, dans laquelle l'élément circulaire (216) est raccordé à un châssis annulaire (214) pouvant être mis en prise par un engrenage raccordé aux moyens d'entraînement (200). 15
11. Brosse selon la revendication 9 ou 10, dans laquelle le galet (220) est raccordé à un élément guidé de manière linéaire (222) à l'aide d'un pivot, l'élément guidé de manière linéaire (222) pouvant être raccordé à l'élément de raccordement (150). 20
12. Brosse selon l'une quelconque des revendications précédentes, qui est une brosse à dents électrique. 25
13. Brosse selon la revendication 8, dans laquelle la base (102) est munie d'une saillie verticale centrale (404, 406) présentant une extrémité libre qui est située en-dessous des extrémités des poils. 30
14. Brosse selon la revendication 13, dans laquelle la saillie verticale centrale est au moins en partie réalisée dans un matériau résilient mou. 35
15. Brosse selon l'une quelconque des revendications précédentes, comprenant : 40
  - un corps principal (502) ;
  - une partie de tête détachable (508) avec la tête de brosse montée de manière rotative (100) sur celle-ci ;
  - un élément entraîné (222) raccordé aux moyens d'entraînement effectuant un mouvement de va-et-vient linéaire dans ledit corps 45

principal ; et

des moyens de couplage prévus sur ledit élément entraîné (222) et sur ledit élément de raccordement (150) pour obtenir un couplage pouvant être éliminé entre les deux, lesdits moyens de couplage étant adaptés pour permettre un couplage entre lesdits éléments lorsque la partie de tête (508) se trouve dans une première orientation par rapport à la partie de corps principal (502), et pour permettre auxdits éléments de se détacher lorsqu'elle se trouve dans une seconde orientation dans laquelle ladite partie de tête (508) tourne par rapport au corps principal (502).

16. Brosse selon la revendication 15, dans laquelle le corps principal (502) et la partie de tête (508) sont munis de moyens de prise (509, 513, 515) pour permettre à ceux-ci d'être emboîtés ensemble ou dégagés l'un de l'autre lorsque la partie de tête se trouve dans la première orientation, et lorsqu'ils sont emboîtés, ils effectuent un mouvement rotatif pour parvenir jusqu'à la seconde orientation dans laquelle la partie de tête ne peut pas se détacher.
17. Brosse selon la revendication 15 ou 16, dans laquelle les moyens de couplage comprennent une paire de branches opposées (516) s'étendant depuis une extrémité de l'élément de raccordement présentant des doigts dirigés vers l'intérieur (518), et une paire de gorges (510) formées sur les faces opposées de l'élément actionné (222) dans lequel les doigts (518) viennent en prise lorsque la partie de tête se trouve dans la seconde orientation.
18. Brosse selon la revendication 16 ou 17, dans lequel les moyens de prise comprennent un bouchon axial (509) formé sur le corps principal, pour être reçu dans une extrémité en forme de prise de la partie de tête (508), le bouchon étant formé avec au moins une patte d'obturation (513) dirigée vers l'extérieur, et la partie de tête étant formée avec une gorge recevant la patte (515) ayant une partie axiale pour permettre un emboîtement de la partie de tête sur le logement, et une partie circonferentielle (517) définissant vers l'intérieur un épaulement derrière lequel la patte (513) s'engage de manière rotative depuis la partie de tête jusqu'à la seconde orientation.
19. Brosse selon l'une quelconque des revendications 15 à 18, dans laquelle l'un parmi l'élément entraîné (222) et l'élément de raccordement (150) est formé à son extrémité de raccordement avec une broche d'assemblage (514), l'autre présentant une prise d'assemblage (520).
20. Brosse selon la revendication 19, dans laquelle la



broche d'assemblage (514) se trouve à l'extrémité de l'élément entraîné (222), qui se rétrécit vers la broche, les branches opposées (516) étant poussées sur le côté lorsque l'élément entraîné (222) et l'élément de raccordement (150) sont couplés ensemble.

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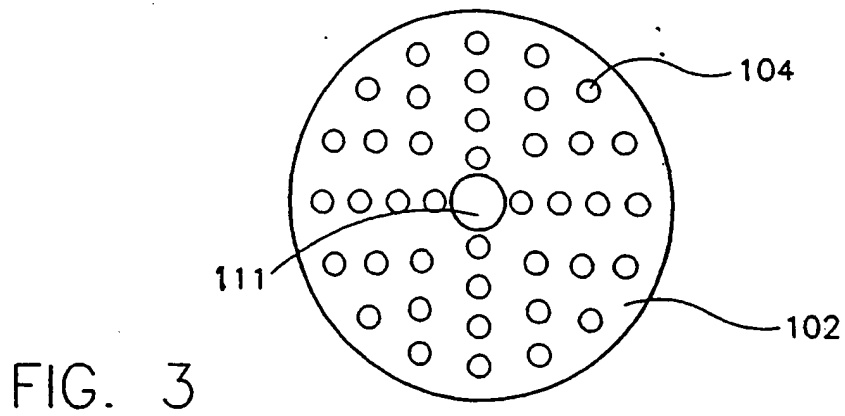
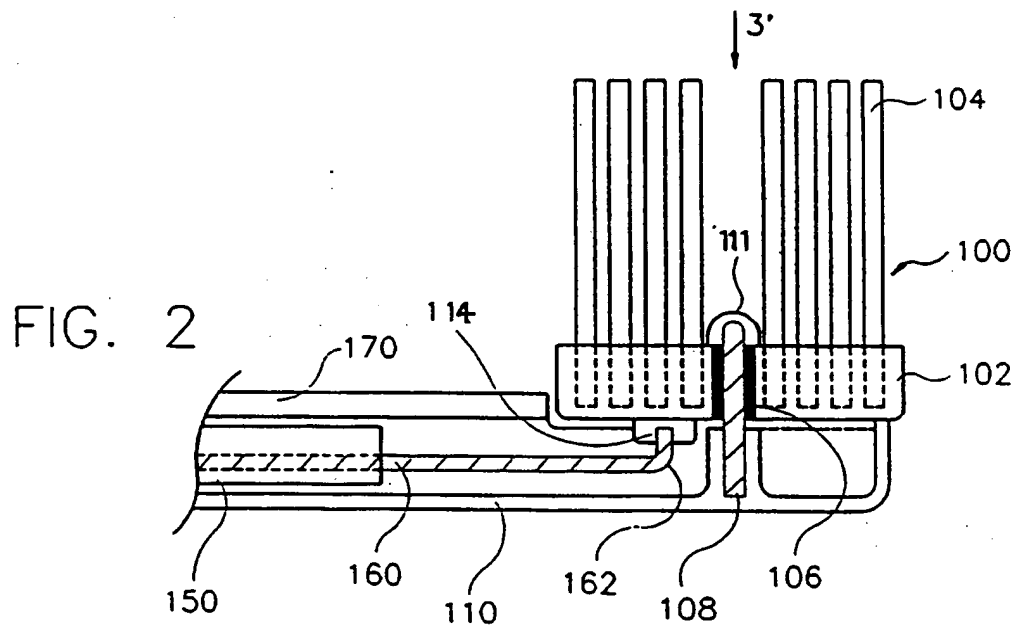
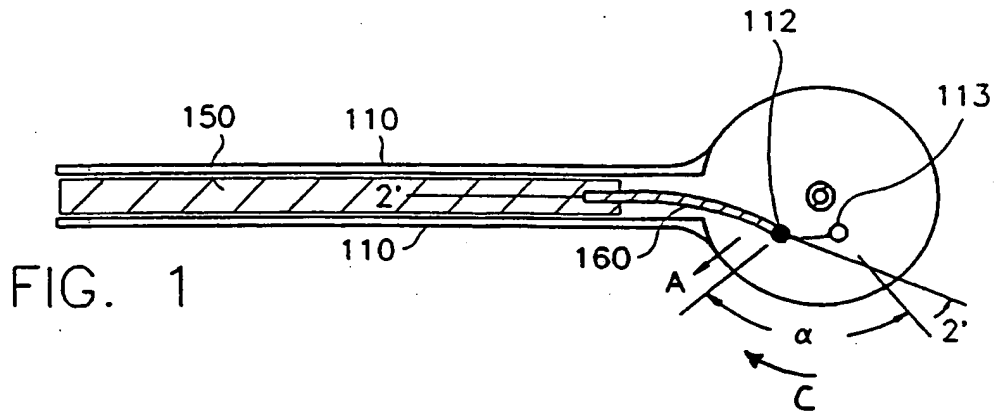
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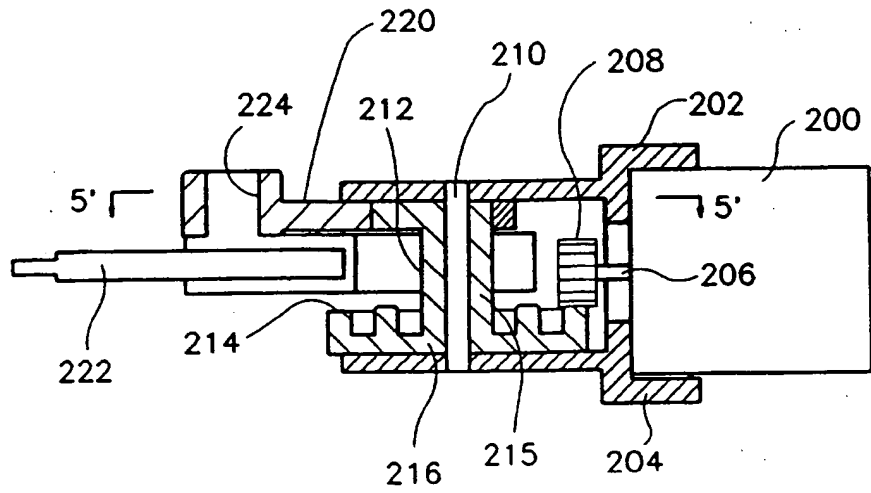


FIG. 4

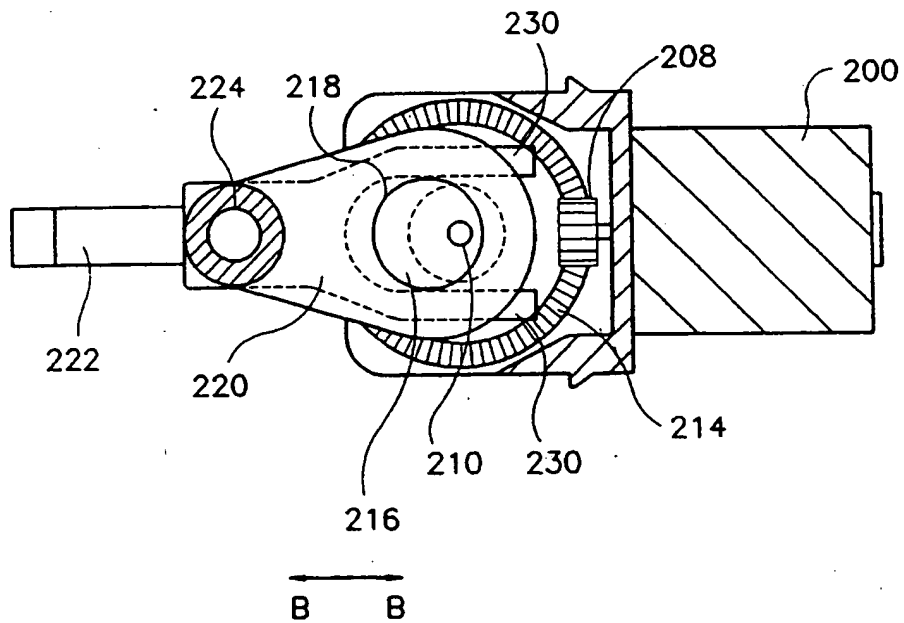


FIG. 5

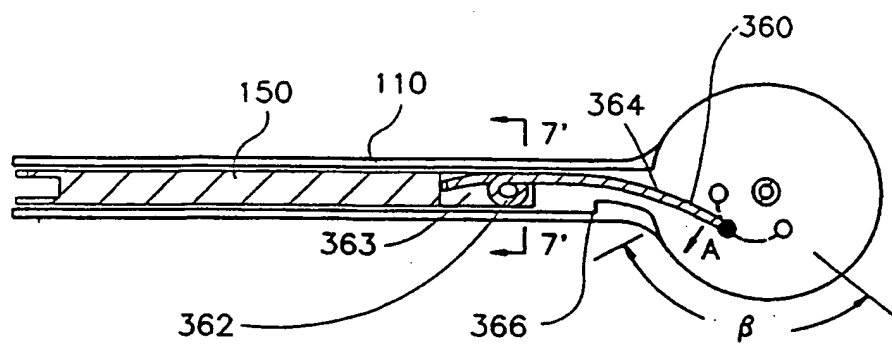


FIG. 6

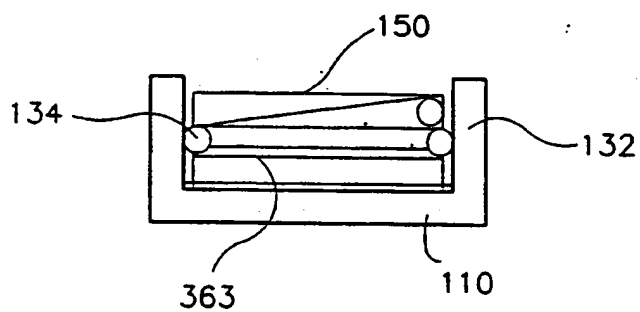


FIG. 7

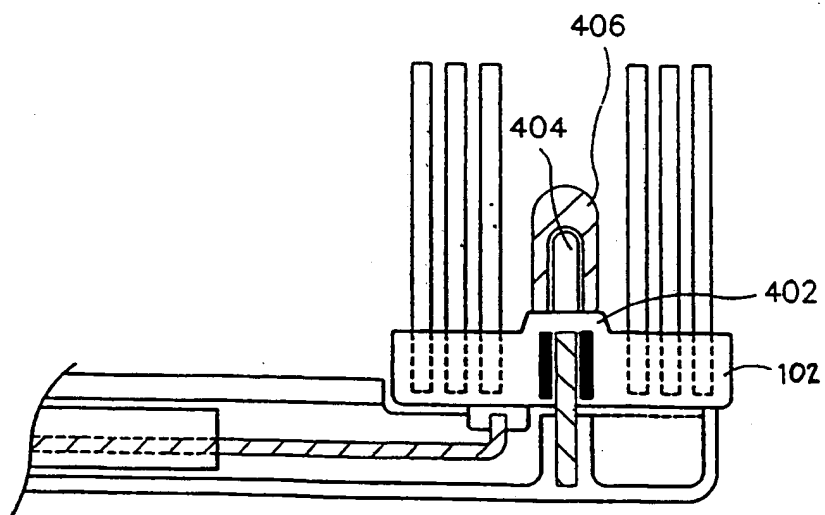


FIG. 8

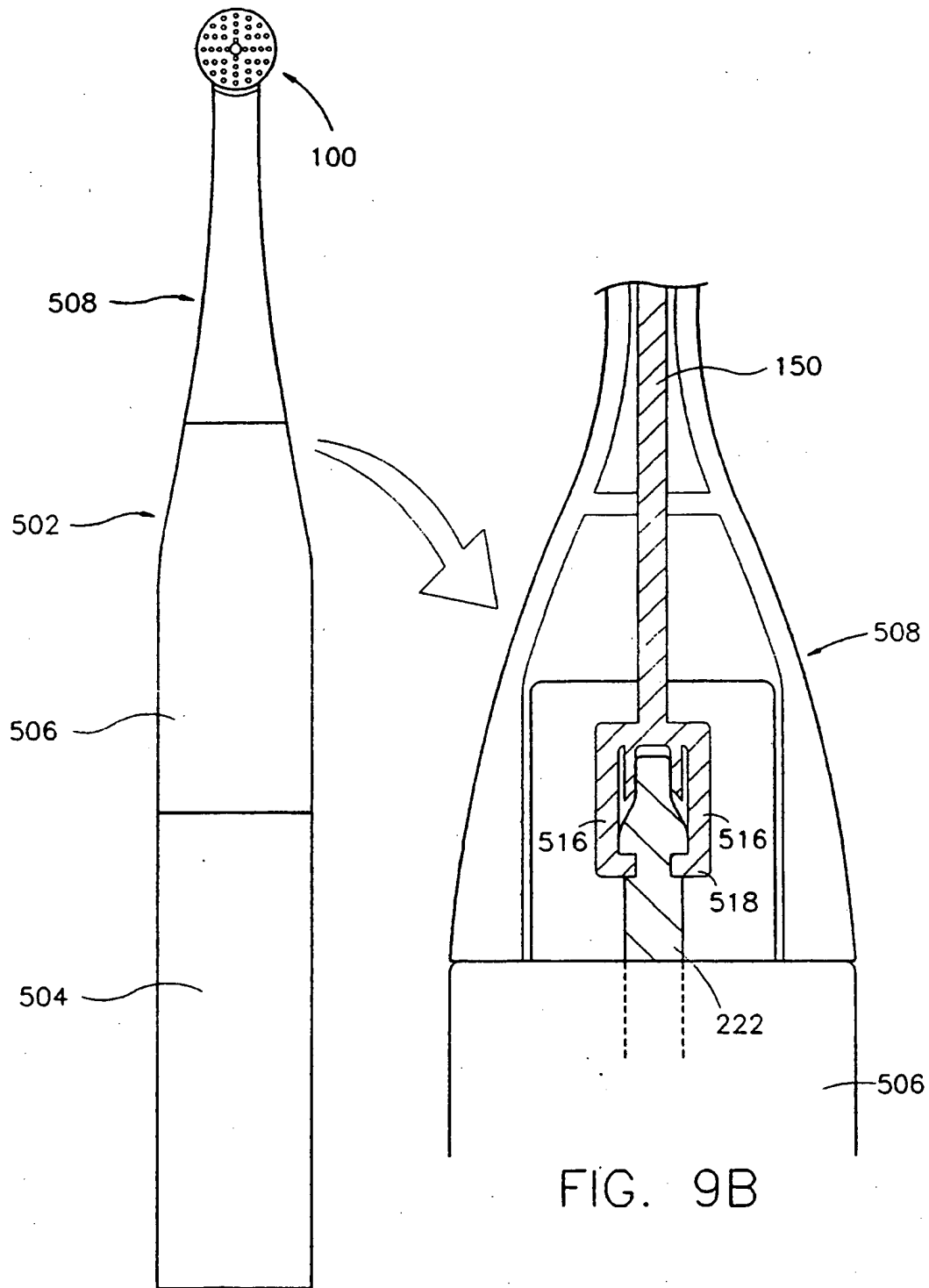


FIG. 9A

FIG. 9B

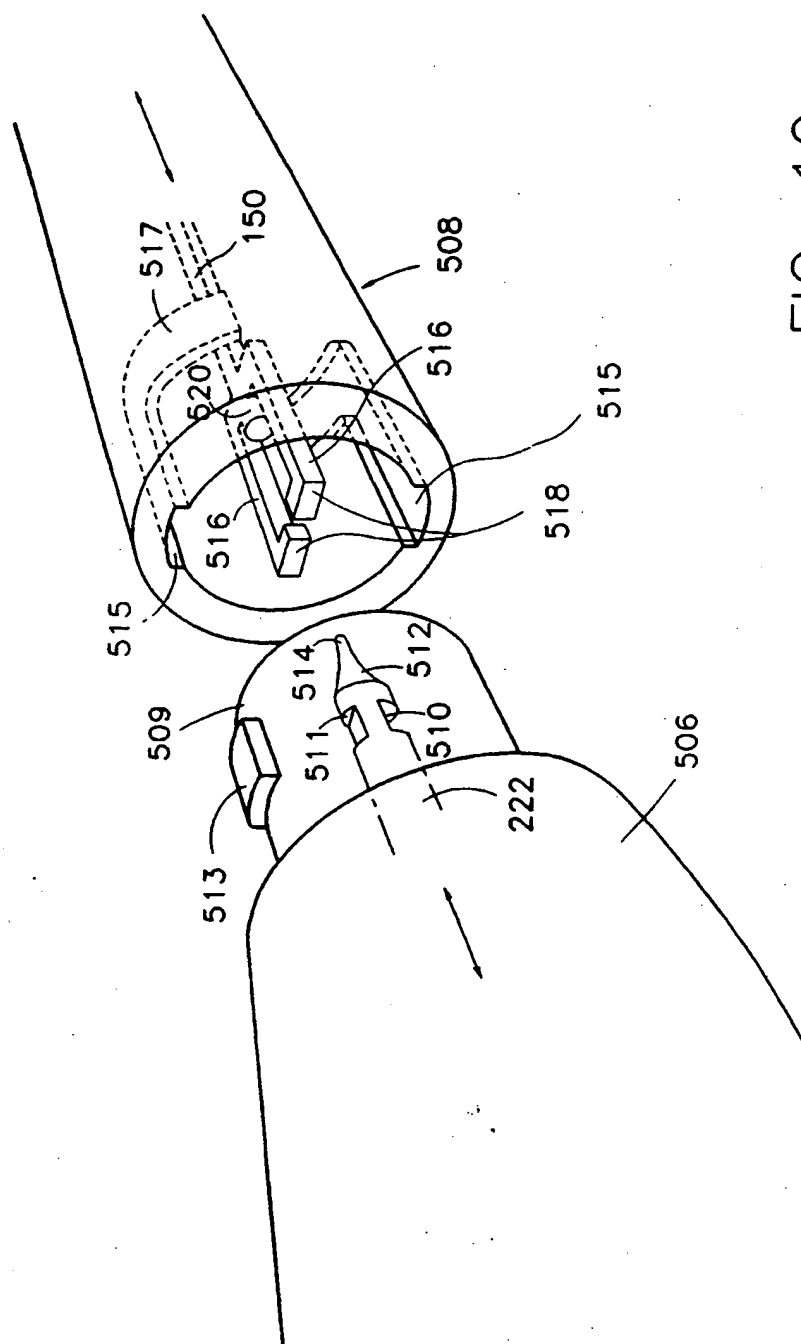


FIG. 10